

AMENDMENTS TO THE CLAIMS

Claims 1-3 (Canceled)

4. (New) An orbital machining apparatus for producing a hole in a workpiece by way of a cutting tool, said apparatus comprising:

5 a first actuator configured for rotating the cutting tool about a cutting tool longitudinal center axis during a machining of the hole;

a second actuator configured for moving the cutting tool in an axial feed direction substantially parallel to said cutting tool longitudinal center axis, said second actuator being simultaneously operable with said first actuator;

10 a third actuator configured for rotating the cutting tool about a principal axis, said principal axis being substantially parallel to said cutting tool longitudinal center axis of the tool and coaxial with a longitudinal center axis of the hole to be machined, said third actuator being simultaneously operable with said first actuator and second actuator; and

15 a radial offset mechanism configured for controlling a radial distance of said cutting tool longitudinal center axis of the cutting tool from said principal axis, said radial offset mechanism including:

an inner cylindrical body having a first eccentric cylindrical hole, said first eccentric hole having a first eccentric hole longitudinal center axis that is parallel to and radially offset from a longitudinal center axis of said inner cylindrical body, said first eccentric hole being
20 configured to radially and rotatably support a spindle unit for operating said cutting tool; and

an outer cylindrical body having a second eccentric cylindrical hole, said second eccentric hole of said outer cylindrical body having a second eccentric hole longitudinal

center axis that is parallel to and radially offset from a longitudinal center axis of said outer cylindrical body, said inner cylindrical body being radially supported in said second eccentric hole of said outer cylindrical body and rotatable therein so as to allow for adjustment of a radial distance of said cutting tool longitudinal center axis of the cutting tool from said principal axis;

said third actuator including a first motor drivingly connected to said outer cylindrical body for individually rotating said outer cylindrical body about said longitudinal center axis of said outer cylindrical body, and a second motor drivingly connected to said inner cylindrical body for individually rotating said inner cylindrical body about said longitudinal center axis of said inner cylindrical body, said first motor and second motor being configured to rotate said outer cylindrical body and said inner cylindrical body in synchronism to maintain a mutual rotary position thereof so as to keep a radial offset position of the cutting tool unchanged during a working operation, said first motor and second motor being further configured to rotate said outer cylindrical body and said inner cylindrical body relative to each other so as to vary said radial offset position of the cutting tool;

said third actuator further including a first rotating drive element coaxial to said outer cylindrical body and driven by said first motor, and a second rotating drive element coaxial to said outer cylindrical body and rotated by said second motor, said second drive element being rotatably connected to a carrier ring by way of two diametrically opposed, radial drive pins such that said carrier ring performs a radial sliding movement along a longitudinal axis of said drive pins relative to said second drive element while being rotated thereby, said carrier ring being connected to said inner cylindrical body by way of two diametrically opposed, radial carrier guide shafts, which are circumferentially spaced 90° from said drive pins, such that said inner cylindrical body performs a radial sliding movement relative to said carrier ring while being

rotated thereby.

5. (New) The orbital machining apparatus of claim 4, further including a belt wheel
rotated by said second motor via an endless belt, said second drive element is coaxially connected
50 to said belt wheel.

6. (New) The orbital machining apparatus of claim 4, wherein said second drive element
constitutes a yoke having two diametrically opposed, axially extending lugs guidingly supporting
said carrier ring by way of said drive pins.